

Interactive comment on “Relation Between the Interannual Variability in the Stratospheric Rossby Wave Forcing and Zonal Mean Fields Suggesting an Interhemispheric Link in the Stratosphere” by Yuki Matsushita et al.

Anonymous Referee #2

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This work examines the interhemispheric coupling in the stratosphere by conducting a statistical analysis of the interannual variability of Rossby wave forcing and mean temperature and zonal wind fields based on MERRA-2 reanalysis. The analysis suggests that the summer/northern stratosphere from the equator to the extratropical region is significantly correlated with the Rossby wave forcing in the winter/southern stratosphere. The authors also show that the meridional gradient of absolute angular momentum is generally near 0 around the equator, conducive of cross-equatorial Brewer-Dobson circulation and thus interhemispheric coupling. By comparing the inter-

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annual variability of wave forcing with solar variability, they show that the latter cannot completely explain the former.

The analysis is quite straightforward and the presentation is generally clear. It addresses an issue largely overlooked in previous studies. I have the following comments/questions for the authors:

1. The analysis focuses on JJA time period. How about boreal winter (DJF)? The same proposed mechanism should apply to the boreal winter too. I don't see any discussion of the stratospheric interhemispheric coupling in the text.
2. Figures 5(a-c) show that the width of the small meridional gradient of absolute angular momentum around the equator varies along with wave forcing. It is not clear how significant this width variation—between 35 and 40 km the variation on each side is about 3 degrees latitude—for interhemispheric coupling. Is there any quantitative justification that this is (or is not) significant for the coupling? And related to my question 1, are the absolute angular momentum and its meridional gradient similar during boreal winter?
3. Figure 6 shows that the wave forcing is not always correlated with the solar activity. On the other hand, it seems over some time periods the forcing has a period of 2-3 years. And it is conceivable that the equatorial dynamical state (including the angular momentum/gradient) could be affected by QBO (probably comparable to solar impact, if not stronger). I wonder if this impact has been looked at in the analysis.
4. Page 7 line 197: "deflected from the midlatitudes". Please clarify whether the waves are deflected toward higher or lower latitudes.

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